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SEQUENCE LISTING

<110> Keating, Mark T.
Sanguinetti, Michael C.
Curran, Mark E.
Landes, Gregory M.
Connors, Timothy D.
Burn, Timothy C.
Splawski, Igor

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<150> 60/094,477

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 Ala Ser Pro Ala Ala Pro Ala Ala Pro Pro Val Ala Ser Asp Leu Gly
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 Pro Arg Pro Pro Val Ser Leu Asp Pro Arg Val Ser Ile Tyr Ser Thr
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 Arg Arg Pro Val Leu Ala Arg Thr His Val Gln Gly Arg Val Tyr Asn
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 Ser Ala Ile Arg Gly Ile Arg Phe Leu Gln Ile Leu Arg Met Leu His
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104

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Lys Pro Ser Pro
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 Met Val Leu Gly Phe Phe Gly Phe Phe Thr Leu Gly Ile Met Leu Ser
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 Tyr Ile Arg Ser Lys Lys Leu Glu His Ser Asn Asp Pro Phe Asn Val
 65 70 75 80
 Tyr Ile Glu Ser Asp Ala Trp Gln Glu Lys Asp Lys Ala Tyr Val Gln
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116

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119

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28

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 20 25 30
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 35 40 45
 Ile Val Val Val Ala Ser Met Val Val Leu Cys Val Gly
 50 55 60

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 <212> PRT
 <213> Homo sapiens

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 Ser Lys Gly Gln Val Phe Ala Thr Ser Ala Ile Arg Gly Ile Arg Phe
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 Arg Leu Leu Gly Ser Val Val Phe Ile His Arg Gln Glu Leu Ile Thr
 35 40 45
 Thr Leu Tyr Ile Gly Phe Leu Gly Leu Ile Phe Ser Ser Tyr Phe Val
 50 55 60
 Tyr Leu Ala Glu Lys Asp Ala Val Asn Glu Ser Gly Arg Val Glu Phe
 65 70 75 80

123

Gly Ser Tyr Ala Asp Ala Leu Trp Trp Gly Val Val Thr Val Thr Thr
 85 90 95
 Ile Gly Tyr Gly Asp Lys Val Pro Gln Thr Trp Val Gly Lys Thr Ile
 100 105 110
 Ala Ser Cys Phe Ser Val Phe Ala Ile Ser Phe Phe Ala Leu Pro Ala
 115 120 125
 Gly Ile Leu Gly Ser Gly Phe Ala Leu
 130 135

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 <213> Drosophila melanogaster

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 20 25 30
 Glu Asp Glu Val Pro Asp Ile Thr Asp Pro Phe Phe Leu Ile Glu Thr
 35 40 45
 Leu Cys Ile Ile Trp Phe Thr Phe Glu Leu Thr Val Arg Phe Leu Ala
 50 55 60
 Cys Pro
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 20 25 30
 Glu Asp Thr Leu Asn Leu Pro Lys Ala Pro Val Ser Pro Gln Asp Lys
 35 40 45
 Ser Ser Asn Gln Ala Met Ser Leu Ala Ile Leu Arg Val Ile Arg Leu
 50 55 60
 Val Arg Val Phe Arg Ile Phe Lys Leu Ser Arg His Ser Lys Gly Leu
 65 70 75 80
 Gln Ile Leu Gly Arg Thr Leu Lys Ala Ser Met Arg Glu Leu Gly Leu
 85 90 95
 Leu Ile Phe Phe Leu Phe Ile Gly Val Val Leu Phe Ser Ser Ala Val
 100 105 110

124

Tyr Phe Ala Glu Ala Gly Ser Glu Asn Ser Phe
115 120

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<212> PRT
<213> *Xenopus laevis*

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Ser Phe Glu Leu Lys Arg Glu Thr Leu Val Ala Thr Asp Pro Pro Arg
35 40 45
Pro Thr Ile Asn Leu Asp Pro Arg Val Ser Ile Tyr Ser Gly Arg Arg
50 55 60
Pro Leu Phe Ser Arg Thr Asn Ile Gln Gly Arg Val Tyr Asn Phe Leu
65 70 75 80
Glu Arg Pro Thr Gly Trp Lys Cys Phe Val Tyr His Phe Thr Val Phe
85 90 95
Leu Ile Val Leu Ile Cys Leu Ile Phe Ser Val Leu Ser Thr Ile Gln
100 105 110
Gln Tyr Asn Asn Leu Ala Thr Glu Thr Leu Phe Trp Met Glu Ile Val
115 120 125
Leu Val Val Phe Phe Gly Ala Glu Tyr Val Val Arg Leu Trp Ser Ala
130 135 140
Gly Cys Arg Ser Lys Tyr Val Gly Val Trp Gly Arg Leu Arg Phe Ala
145 150 155 160
Arg Lys Pro Ile Ser Val Ile Asp Leu Ile Val Val Val Ala Ser Val
165 170 175

Ile Val Leu Cys Val Gly Ser Asn Gly Gln Val Phe Ala Thr Ser Ala
180 185 190

Ile Arg Gly Ile Arg Phe Leu Gln Ile Leu Arg Met Leu His Val Asp
195 200 205

Arg Gln Gly Gly Thr Trp Arg Leu Leu Gly Ser Val Val Phe Ile His
210 215 220

Arg Gln Glu Leu Ile Thr Thr Leu Tyr Ile Gly Phe Leu Gly Leu Ile
225 230 235 240

Phe Ser Ser Tyr Phe Val Tyr Leu Ala Glu Lys Asp Ala Ile Asp Ser
245 250 255

Ser Gly Glu Tyr Gln Phe Gly Ser Tyr Ala Asp Ala Leu Trp Trp Gly
260 265 270

Val Val Thr Val Thr Thr Ile Gly Tyr Gly Asp Lys Val Pro Gln Thr
275 280 285

Trp Ile Gly Lys Thr Ile Ala Ser Cys Phe Ser Val Phe Ala Ile Ser
290 295 300

Phe Phe Ala Leu Pro Ala Gly Ile Leu Gly Ser Gly Phe Ala Leu Lys
305 310 315 320

Val Gln Gln Lys Gln Arg Gln Lys His Phe Asn Arg Gln Ile Pro Ala
325 330 335

Ala Ala Ser Leu Ile Gln Thr Ala Trp Arg Cys Tyr Ala Ala Glu Asn
340 345 350

Pro Asp Ser Ala Thr Trp Lys Ile Tyr Ile Arg Lys Gln Ser Arg Asn
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His His Ile Met Ser Pro Ser Pro
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Phe Ser Val Leu Ser Thr Ile Glu Gln Tyr Ala Ala Leu Ala Thr Gly
35 40 45

Thr Leu Phe Trp Met Glu Ile Val Leu Val Val Phe Phe Gly Thr Glu
50 55 60

Tyr Val Val Arg Leu Trp Ser Ala Gly Cys Arg Ser Lys Tyr Val Gly
65 70 75 80

Leu Trp Gly Arg Leu Arg Phe Ala Arg Lys Pro Ile Ser Ile Ile Asp
85 90 95

126

Leu Ile Val Val Val Ala Ser Met Val Val Leu Cys Val Gly Ser Lys
 100 105 110
 Gly Gln Val Phe Ala Thr Ser Ala Ile Arg Gly Ile Arg Phe Leu Gln
 115 120 125
 Ile Leu Arg Met Leu His Val Asp Arg Gln Gly Gly Thr Trp Arg Leu
 130 135 140
 Leu Gly Ser Val Val Phe Ile His Arg Gln Glu Leu Ile Thr Thr Leu
 145 150 155 160
 Tyr Ile Gly Phe Leu Gly Leu Ile Phe Ser Ser Tyr Phe Val Tyr Leu
 165 170 175
 Ala Glu Lys Asp Ala Val Asn Glu Ser Gly Arg Val Glu Phe Gly Ser
 180 185 190
 Tyr Ala Asp Ala Leu Trp Trp Gly Val Val Thr Val Thr Thr Ile Gly
 195 200 205
 Tyr Gly Asp Lys Val Pro Gln Thr Trp Val Gly Lys Thr Ile Ala Ser
 210 215 220
 Cys Phe Ser Val Phe Ala Ile Ser Phe Phe Ala Leu Pro Ala Gly Ile
 225 230 235 240
 Leu Gly Ser Gly Phe Ala Leu Lys Val Gln Gln Lys Gln Arg Gln Lys
 245 250 255
 His Phe Asn Arg Gln Ile Pro Ala Ala Ala Ser Leu Ile Gln Thr Ala
 260 265 270
 Trp Arg Cys Tyr Ala Ala Glu Asn Pro Asp Ser Ser Thr Trp Lys Ile
 275 280 285
 Tyr Ile Arg Lys Ala Pro Arg Ser His Thr Leu Leu Ser Pro Ser Pro
 290 295 300
 Lys Pro Lys Lys Ser Val Val Val Lys Lys Lys Lys Phe Lys Leu Asp
 305 310 315 320
 Lys Asp Asn Gly Val Thr Pro Gly Glu Lys Met Leu Thr Val Pro His
 325 330 335
 Ile Thr Cys Asp Pro Pro Glu Glu Arg Arg Leu Asp His Phe Ser Val
 340 345 350
 Asp Gly Tyr Asp Ser Ser Val Arg Lys Ser Pro Thr Leu Leu Glu Val
 355 360 365
 Ser Met Pro His Phe Met Arg Thr Asn Ser Phe Ala Glu Asp Leu Asp
 370 375 380
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 385 390 395 400
 Arg Glu His His Arg Ala Thr Ile Lys Val Ile Arg Arg Met Gln Tyr
 405 410 415
 Phe Val Ala Lys Lys Lys Phe Gln Gln Ala Arg Lys Pro Tyr Asp Val
 420 425 430

Arg Asp Val Ile Glu Gln Tyr Ser Gln Gly His Leu Asn Leu Met Arg
435 440 445

Val Ile Lys Glu Leu Gln Arg Arg Leu Asp Gln Ser Ile Gly Lys Pro
450 455 460

Ser Leu Phe Ile Ser Val Ser Glu Lys Ser Lys Asp Arg Gly Ser Asn
465 470 475 480

Thr Ile Gly Ala Arg Leu Asn Arg Val Glu Asp Lys Val Thr Gln Leu
485 490 495

Asp Gln Arg Leu Ala Leu Ile Thr Asp Met Leu His Gln Leu Leu Ser
500 505 510

Leu His Gly Gly Ser Thr Pro Gly Ser Gly Gly Pro Pro Arg Glu Gly
515 520 525

Gly Ala His Ile Thr Gln Pro Cys Gly Ser Gly Gly Ser Val Asp Pro
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Met Glu Thr Arg Gly Ser Arg Leu Thr
1 5

ggc ggc cag ggc cgc gtc tac aac ttc ctc gag cgt ccc acc ggc tgg 162
Gly Gly Gln Gly Arg Val Tyr Asn Phe Leu Glu Arg Pro Thr Gly Trp
10 15 20 25

aaa tgc ttc gtt tac cac ttc gcc gtc ttc ctc atc gtc ctg gtc tgc 210
Lys Cys Phe Val Tyr His Phe Ala Val Phe Leu Ile Val Leu Val Cys
30 35 40

ctc atc ttc agc gtg ctg tcc acc atc gag cag tat gcc gcc ctg gcc 258
Leu Ile Phe Ser Val Leu Ser Thr Ile Glu Gln Tyr Ala Ala Leu Ala
45 50 55

acg ggg act ctc ttc tgg atg gag atc gtg ctg gtg gtg ttc ttc ggg 306
Thr Gly Thr Leu Phe Trp Met Glu Ile Val Leu Val Val Phe Phe Gly
60 65 70

acg gag tac gtg gtc cgc ctc tgg tcc gcc ggc tgc cgc agc aag tac 354
Thr Glu Tyr Val Val Arg Leu Trp Ser Ala Gly Cys Arg Ser Lys Tyr
75 80 85

128

gtg ggc ctc tgg ggg cgg ctg cgc ttt gcc cgg aag ccc att tcc atc	402
Val Gln Leu Trp Gly Arg Leu Arg Phe Ala Arg Lys Pro Ile Ser Ile	
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Ile Asp Leu Ile Val Val Val Ala Ser Met Val Val Leu Cys Val Gly	
110 115 120	
tcc aag ggg cag gtg ttt gcc acg tgc gcc atc agg ggc atc cgc ttc	498
Ser Lys Gly Gln Val Phe Ala Thr Ser Ala Ile Arg Gly Ile Arg Phe	
125 130 135	
ctg cag atc ctg agg atg cta cac gtc gac cgc cag gga ggc acc tgg	546
Leu Gln Ile Leu Arg Met Leu His Val Asp Arg Gln Gly Gly Thr Trp	
140 145 150	
agg ctc ctg ggc tcc gtg gtc ttc atc cac cgc cag gag ctg ata acc	594
Arg Leu Leu Gly Ser Val Val Phe Ile His Arg Gln Glu Leu Ile Thr	
155 160 165	
acc ctg tac atc ggc ttc ctg ggc ctc atc ttc tcc tcg tac ttt gtg	642
Thr Leu Tyr Ile Gly Phe Leu Gly Leu Ile Phe Ser Ser Tyr Phe Val	
170 175 180 185	
tac ctg gct gag aag gac gcg gtg aac gag tca ggc cgc gtg gag ttc	690
Tyr Leu Ala Glu Lys Asp Ala Val Asn Glu Ser Gly Arg Val Glu Phe	
190 195 200	
ggc agc tac gca gat gcg ctg tgg tgg ggg gtg gtc aca gtc acc acc	738
Gly Ser Tyr Ala Asp Ala Leu Trp Trp Gly Val Val Thr Val Thr Thr	
205 210 215	
atc ggc tat ggg gac aag gtg ccc cag acg tgg gtc ggg aag acc atc	786
Ile Gly Tyr Gly Asp Lys Val Pro Gln Thr Trp Val Gly Lys Thr Ile	
220 225 230	
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Ala Ser Cys Phe Ser Val Phe Ala Ile Ser Phe Phe Ala Leu Pro Ala	
235 240 245	
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Gly Ile Leu Gly Ser Gly Phe Ala Leu Lys Val Gln Gln Lys Gln Arg	
250 255 260 265	
cag aag cac ttc aac cgg cag atc ccg gcg gca gcc tca ctc att cag	930
Gln Lys His Phe Asn Arg Gln Ile Pro Ala Ala Ala Ser Leu Ile Gln	
270 275 280	
acc gca tgg agg tgc tat gct gcc gag aac ccc gac tcc tcc acc tgg	978
Thr Ala Trp Arg Cys Tyr Ala Ala Glu Asn Pro Asp Ser Ser Thr Trp	
285 290 295	
aag atc tac atc cgg aag gcc ccc cgg agc cac act ctg ctg tca ccc	1026
Lys Ile Tyr Ile Arg Lys Ala Pro Arg Ser His Thr Leu Leu Ser Pro	
300 305 310	
agc ccc aaa ccc aag aag tct gtg gtg gta aag aaa aaa aag ttc aag	1074
Ser Pro Lys Pro Lys Lys Ser Val Val Val Lys Lys Lys Lys Phe Lys	
315 320 325	
ctg gac aaa gac aat ggg gtg act cct gga gag aag atg ctc aca gtc	1122
Leu Asp Lys Asp Asn Gly Val Thr Pro Gly Glu Lys Met Leu Thr Val	
330 335 340 345	

ccc cat atc acg tgc gac ccc cca gaa gag cgg cgg ctg gac cac ttc	1170
Pro His Ile Thr Cys Asp Pro Pro Glu Glu Arg Arg Leu Asp His Phe	
350 355 360	
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Ser Val Asp Gly Tyr Asp Ser Ser Val Arg Lys Ser Pro Thr Leu Leu	
365 370 375	
gaa gtg agc atg ccc cat ttc atg aga acc aac agc ttc gcc gag gac	1266
Glu Val Ser Met Pro His Phe Met Arg Thr Asn Ser Phe Ala Glu Asp	
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ctg gac ctg gaa ggg gag act ctg ctg aca ccc atc acc cac atc tca	1314
Leu Asp Leu Glu Gly Glu Thr Leu Leu Thr Pro Ile Thr His Ile Ser	
395 400 405	
cag ctg cgg gaa cac cat cgg gcc acc att aag gtc att cga cgc atg	1362
Gln Leu Arg Glu His His Arg Ala Thr Ile Lys Val Ile Arg Arg Met	
410 415 420 425	
cag tac ttt gtg gcc aag aag aaa ttc cag caa gcg cgg aag cct tac	1410
Gln Tyr Phe Val Ala Lys Lys Lys Phe Gln Gln Ala Arg Lys Pro Tyr	
430 435 440	
gat gtg cgg gac gtc att gag cag tac tcg cag ggc cac ctc aac ctc	1458
Asp Val Arg Asp Val Ile Glu Gln Tyr Ser Gln Gly His Leu Asn Leu	
445 450 455	
atg gtg cgc atc aag gag ctg cag agg agg ctg gac cag tcc att ggg	1506
Met Val Arg Ile Lys Glu Leu Gln Arg Arg Leu Asp Gln Ser Ile Gly	
460 465 470	
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Lys Pro Ser Leu Phe Ile Ser Val Ser Glu Lys Ser Lys Asp Arg Gly	
475 480 485	
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Ser Asn Thr Ile Gly Ala Arg Leu Asn Arg Val Glu Asp Lys Val Thr	
490 495 500 505	
cag ctg gac cag agg ctg gca ctc atc acc gac atg ctt cac cag ctg	1650
Gln Leu Asp Gln Arg Leu Ala Leu Ile Thr Asp Met Leu His Gln Leu	
510 515 520	
ctc tcc ttg cac ggt ggc agc acc ccc ggc agc ggc ggc ccc ccc aga	1698
Leu Ser Leu His Gly Gly Ser Thr Pro Gly Ser Gly Gly Pro Pro Arg	
525 530 535	
gag ggc ggg gcc cac atc acc cag ccc tgc ggc agt ggc ggc tcc gtc	1746
Glu Gly Gly Ala His Ile Thr Gln Pro Cys Gly Ser Gly Gly Ser Val	
540 545 550	
gac cct gag ctc ttc ctg ccc agc aac acc ctg ccc acc tac gag cag	1794
Asp Pro Glu Leu Phe Leu Pro Ser Asn Thr Leu Pro Thr Tyr Glu Gln	
555 560 565	
ctg acc gtg ccc agg agg ggc ccc gat gag ggg tcc tgaggagggg	1840
Leu Thr Val Pro Arg Arg Gly Pro Asp Glu Gly Ser	
570 575 580	
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ctctgaagga ggccacctcc taaaaggccc agagagaaga gcccactct cagaggcccc	1960

aataccccat ggaccatgct gtctggcaca gcctgcactt gggggctcag caaggccacc 2020
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<400> 116
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 35 40 45
 Thr Ile Glu Gln Tyr Ala Ala Leu Ala Thr Gly Thr Leu Phe Trp Met
 50 55 60
 Glu Ile Val Leu Val Val Phe Phe Gly Thr Glu Tyr Val Val Arg Leu
 65 70 75 80
 Trp Ser Ala Gly Cys Arg Ser Lys Tyr Val Gly Leu Trp Gly Arg Leu
 85 90 95
 Arg Phe Ala Arg Lys Pro Ile Ser Ile Ile Asp Leu Ile Val Val Val
 100 105 110
 Ala Ser Met Val Val Leu Cys Val Gly Ser Lys Gly Gln Val Phe Ala
 115 120 125
 Thr Ser Ala Ile Arg Gly Ile Arg Phe Leu Gln Ile Leu Arg Met Leu
 130 135 140

His Val Asp Arg Gln Gly Gly Thr Trp Arg Leu Leu Gly Ser Val Val
 145 150 155 160
 Phe Ile His Arg Gln Glu Leu Ile Thr Thr Leu Tyr Ile Gly Phe Leu
 165 170 175
 Gly Leu Ile Phe Ser Ser Tyr Phe Val Tyr Leu Ala Glu Lys Asp Ala
 180 185 190
 Val Asn Glu Ser Gly Arg Val Glu Phe Gly Ser Tyr Ala Asp Ala Leu
 195 200 205
 Trp Trp Gly Val Val Thr Val Thr Thr Ile Gly Tyr Gly Asp Lys Val
 210 215 220
 Pro Gln Thr Trp Val Gly Lys Thr Ile Ala Ser Cys Phe Ser Val Phe
 225 230 235 240
 Ala Ile Ser Phe Phe Ala Leu Pro Ala Gly Ile Leu Gly Ser Gly Phe
 245 250 255
 Ala Leu Lys Val Gln Gln Lys Gln Arg Gln Lys His Phe Asn Arg Gln
 260 265 270
 Ile Pro Ala Ala Ala Ser Leu Ile Gln Thr Ala Trp Arg Cys Tyr Ala
 275 280 285
 Ala Glu Asn Pro Asp Ser Ser Thr Trp Lys Ile Tyr Ile Arg Lys Ala
 290 295 300
 Pro Arg Ser His Thr Leu Leu Ser Pro Ser Pro Lys Pro Lys Lys Ser
 305 310 315 320
 Val Val Val Lys Lys Lys Lys Phe Lys Leu Asp Lys Asp Asn Gly Val
 325 330 335
 Thr Pro Gly Glu Lys Met Leu Thr Val Pro His Ile Thr Cys Asp Pro
 340 345 350
 Pro Glu Glu Arg Arg Leu Asp His Phe Ser Val Asp Gly Tyr Asp Ser
 355 360 365
 Ser Val Arg Lys Ser Pro Thr Leu Leu Glu Val Ser Met Pro His Phe
 370 375 380
 Met Arg Thr Asn Ser Phe Ala Glu Asp Leu Asp Leu Glu Gly Glu Thr
 385 390 395 400
 Leu Leu Thr Pro Ile Thr His Ile Ser Gln Leu Arg Glu His His Arg
 405 410 415
 Ala Thr Ile Lys Val Ile Arg Arg Met Gln Tyr Phe Val Ala Lys Lys
 420 425 430
 Lys Phe Gln Gln Ala Arg Lys Pro Tyr Asp Val Arg Asp Val Ile Glu
 435 440 445
 Gln Tyr Ser Gln Gly His Leu Asn Leu Met Val Arg Ile Lys Glu Leu
 450 455 460
 Gln Arg Arg Leu Asp Gln Ser Ile Gly Lys Pro Ser Leu Phe Ile Ser
 465 470 475 480

132

Val Ser Glu Lys Ser Lys Asp Arg Gly Ser Asn Thr Ile Gly Ala Arg
485 490 495

Leu Asn Arg Val Glu Asp Lys Val Thr Gln Leu Asp Gln Arg Leu Ala
500 505 510

Leu Ile Thr Asp Met Leu His Gln Leu Leu Ser Leu His Gly Gly Ser
515 520 525

Thr Pro Gly Ser Gly Gly Pro Pro Arg Glu Gly Gly Ala His Ile Thr
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Gln Pro Cys Gly Ser Gly Gly Ser Val Asp Pro Glu Leu Phe Leu Pro
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